



Philippine Coal Plant Users' Group

Coal Blending

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Coal Combustion Inc.
Understanding the business of coal

Coal Blending Talk

1. What Blends

2. Blending Variable Coal

3. Setting up the Plant

Coal Blending

Chemical Data Blends

“ Heating Value

“ Sulfur

“ Ash Chemistry

Coal Blending

Physical Test Difficult

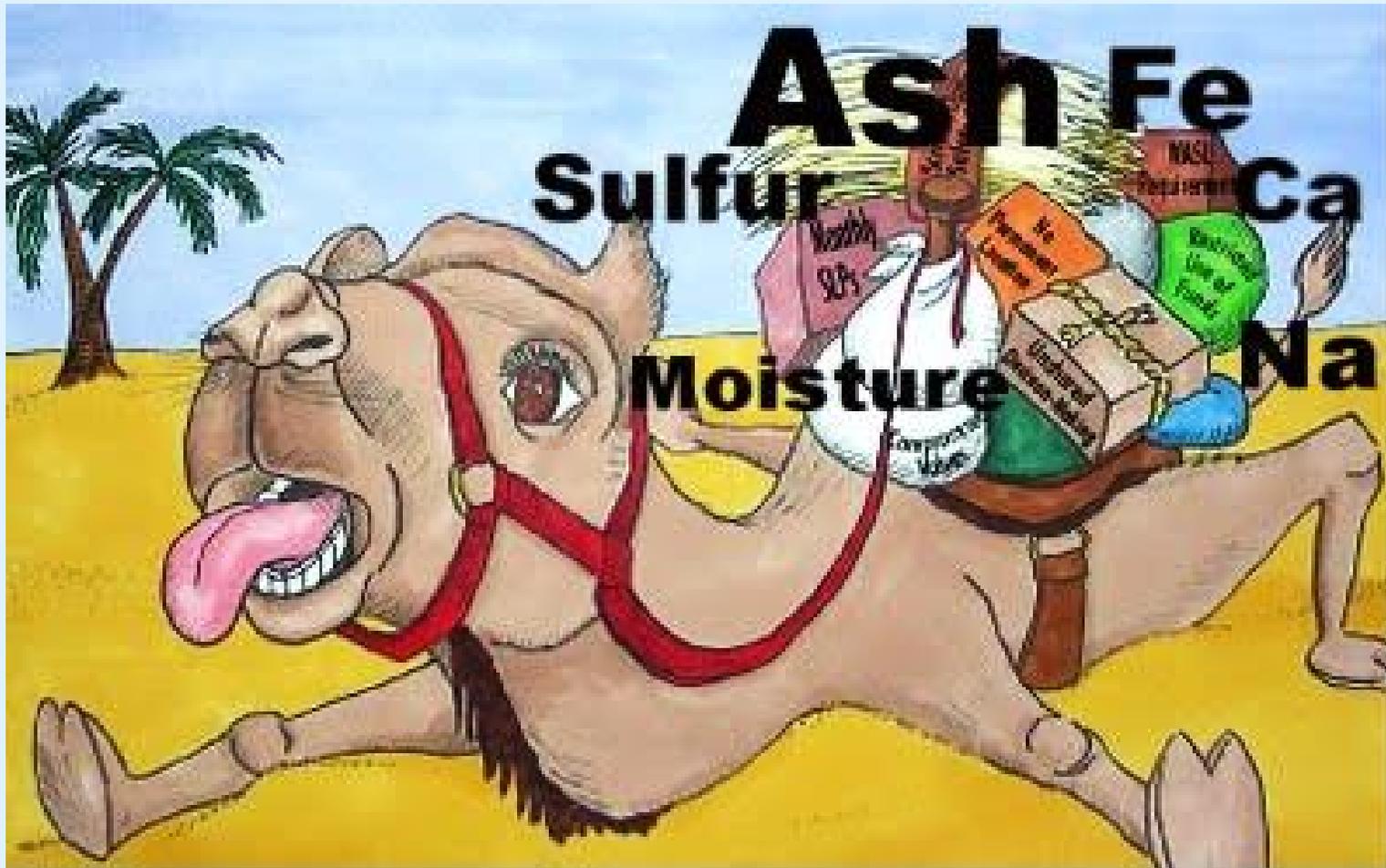
“ Hardgrove (HGI)

“ Ash Fusion Temps

“ Combustion Properties

**Lets look at all boiler related
coal qualities on a heat
basis; lets put all
percentages on a per million
Kcal basis**

LOADING LEVELS



**Your plant has limits.
How close are you?**

Kg. of ash/MKcal

= %ash / (Kcal/10,000)

Kg. of element/MKcal

$$= \%ash / (Kcal/10,000) \\ \times (\%Element/100)$$

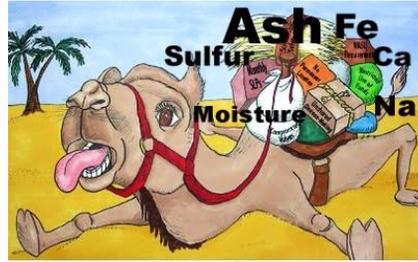
**Many slagging concerns
have been addressed using
Ash Loading and Elemental
loading levels; especially**

Fe_2O_3 , CaO , Na_2O

Measuring Coal Quality

**Lab Data only produces
average data**

**Power plants respond to
swings in quality**



Plant Limit

Average

Does this coal met spec?

Engineering

1.5 meter desk



1.55 meter door

Fits through every time

Coal Quality



1.55 Meter
Door

Only about 1/2 people fit

All Coals have

VARIABILITY

Washed, Processed,

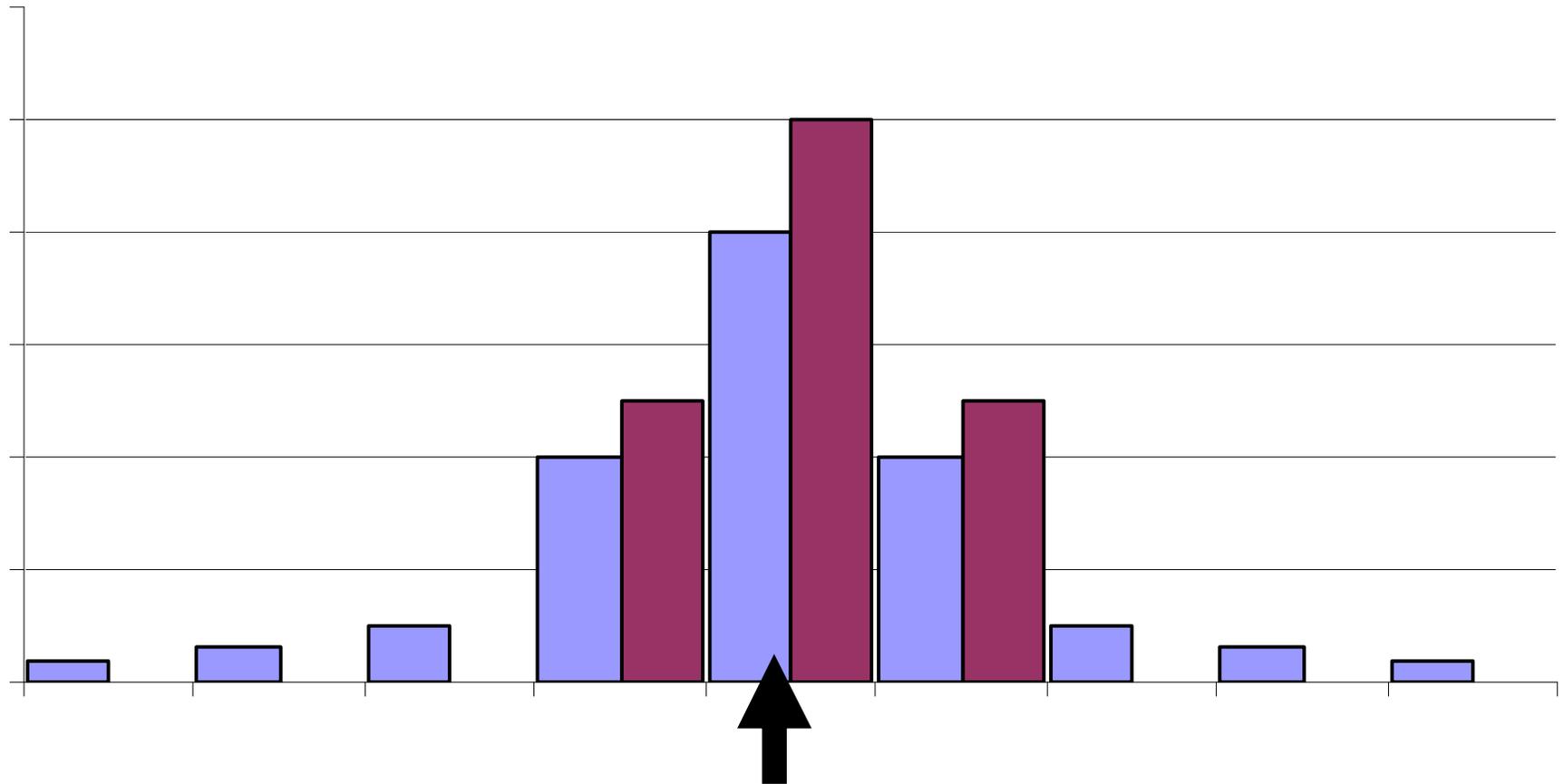
Controlled Mining

Higher Cost

Raw, Uncontrolled Mining

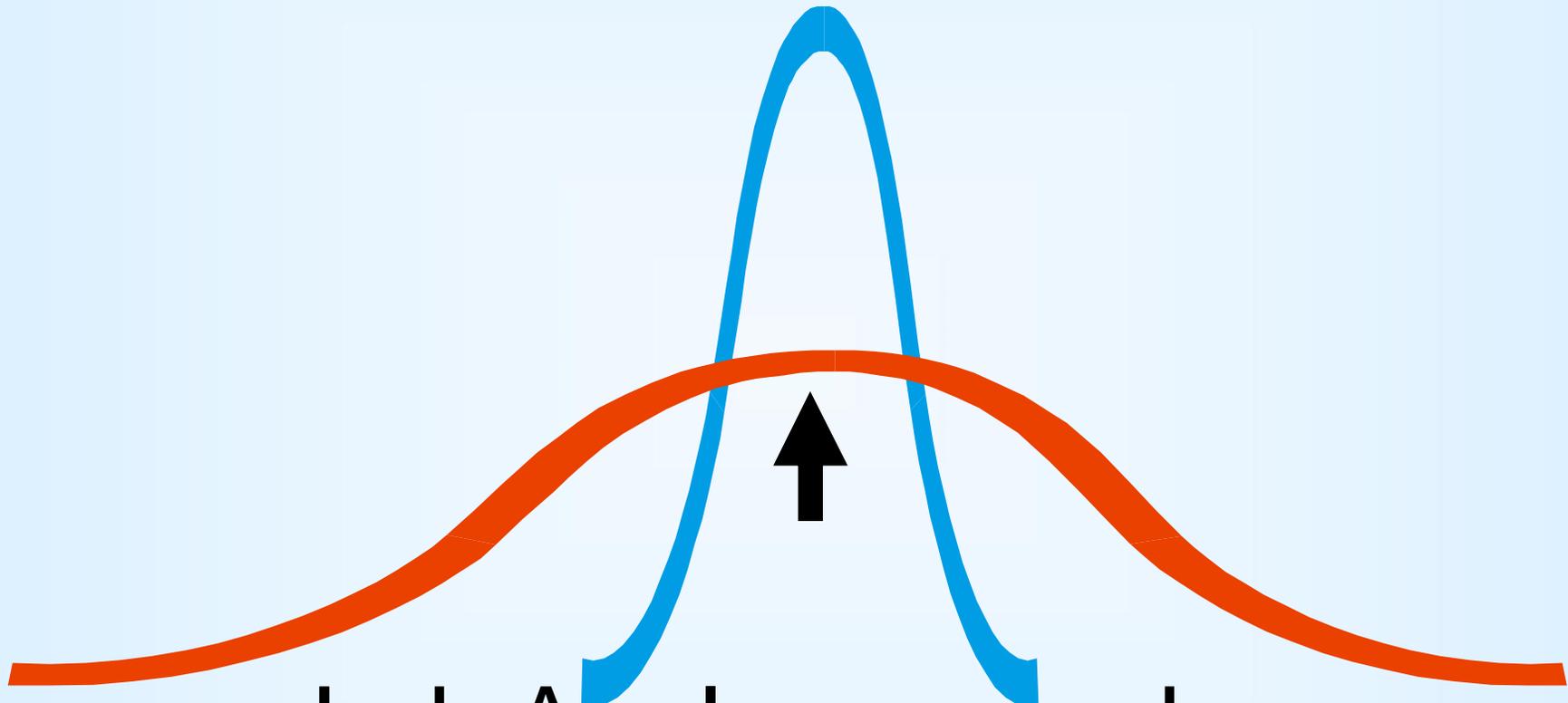
Lower Cost

Small and Large Variability



Same Average

Small and Large Variability

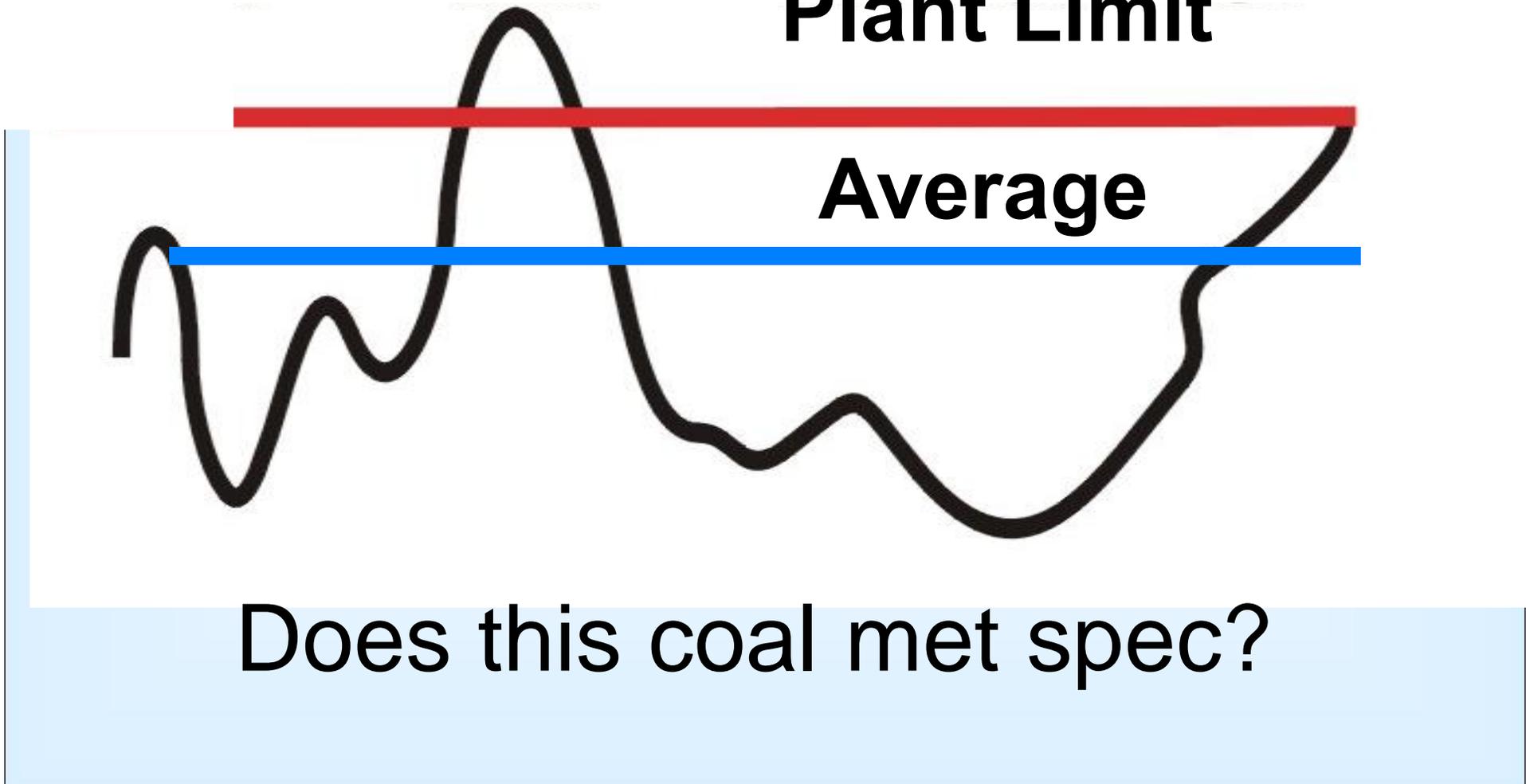


Lab Analyses produce
Exact Same Data

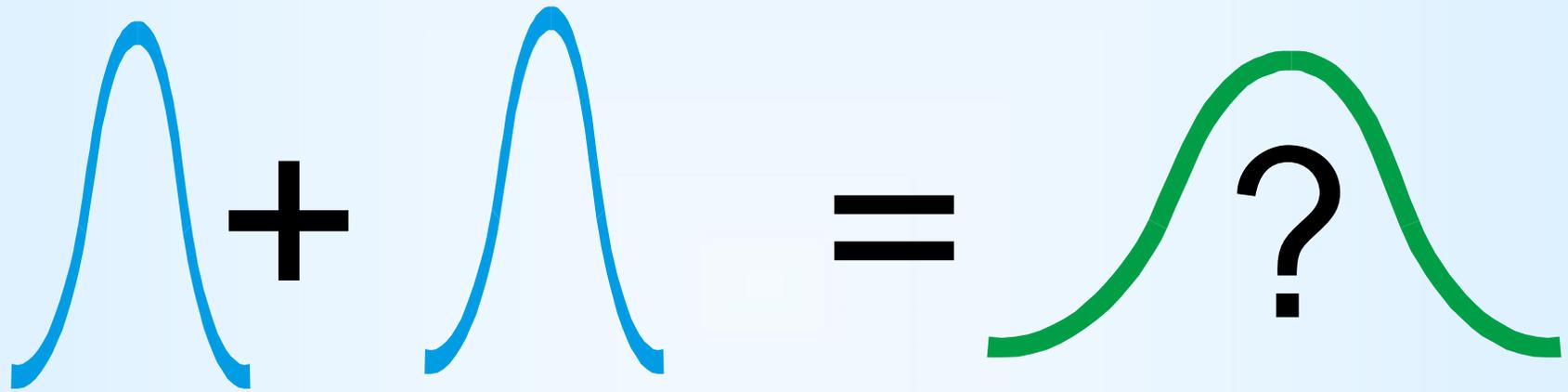
Plant Limit

Average

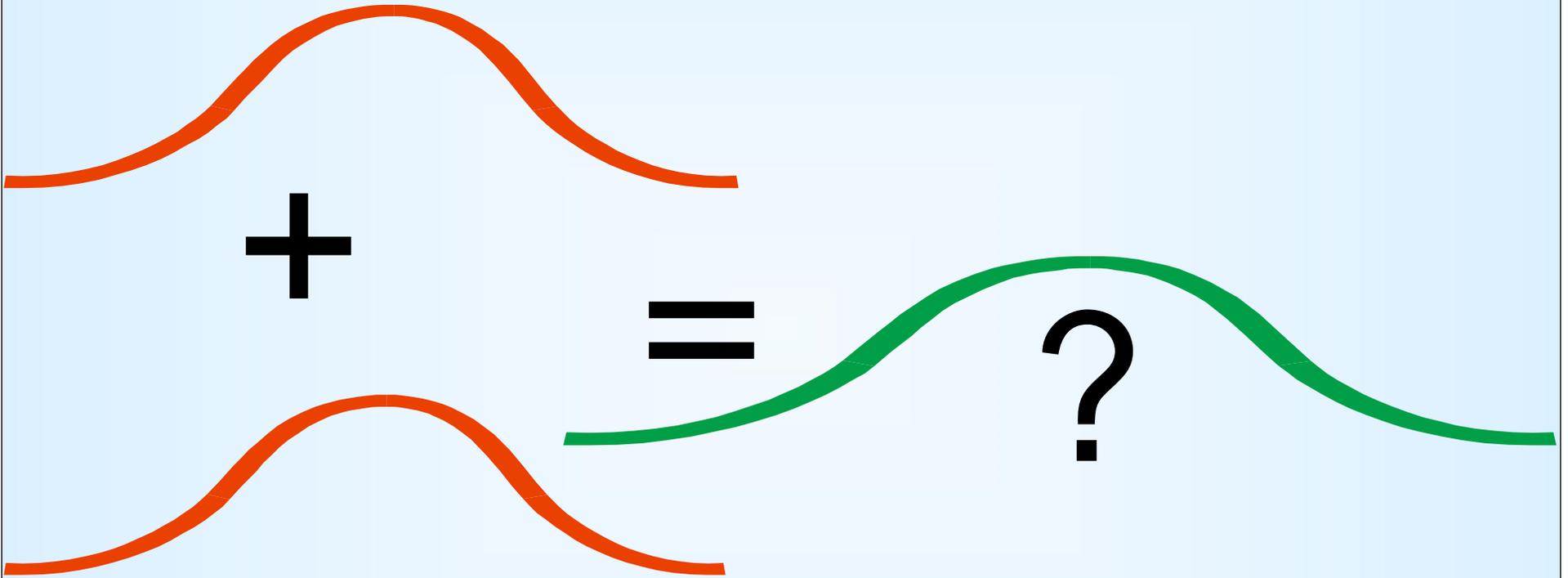
Does this coal met spec?



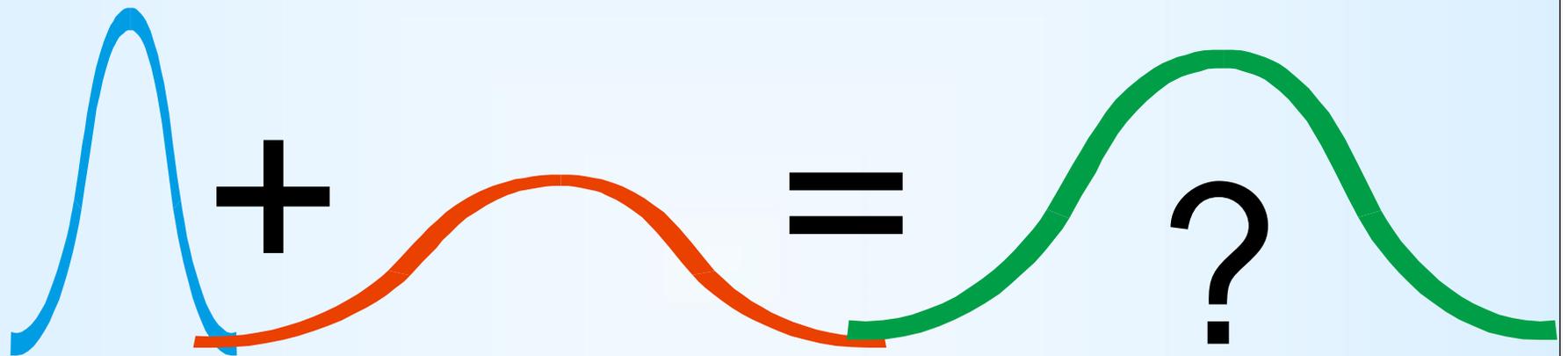
Blending Variability



Blending Variability



Blending Variability



Results of Test #1

PRB Coal
%fresh+



Results of Test #1

PRB Coal
aged 1 hr



Results of Test #1

PRB Coal
aged - 5 hr



Results of Test #1

PRB Coal
aged - 1 day



Results of Test #1

PRB Coal
aged - 2 days



Results of Test #1

PRB Coal
aged - 4 days



Results of Test #1

PRB Coal
aged - 6 days



Results of Test #1

PRB Coal
aged - 6 days
(1)



Results of Test #1

PRB Coal
aged - 6 days
(2)



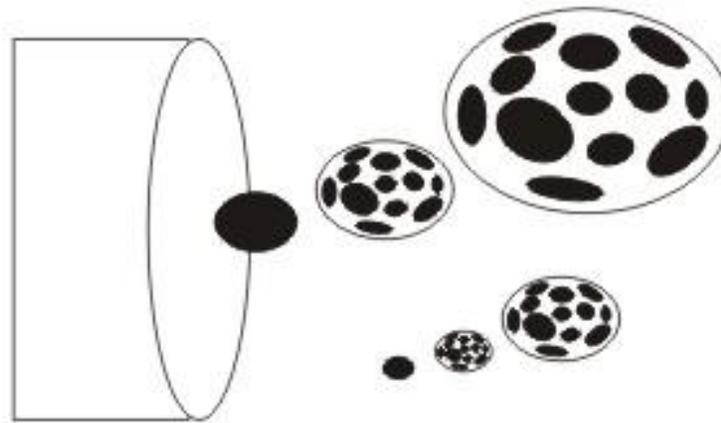
Coal Combustion

Bituminous

1. Maintain 70% passing 200 mesh screen
2. High Calorific Value and low moisture
allow for low mill loading
3. Lower Primary Air due to lower coal flow
can allow for rejects

Bit Coal Combustion

Bituminous or coking



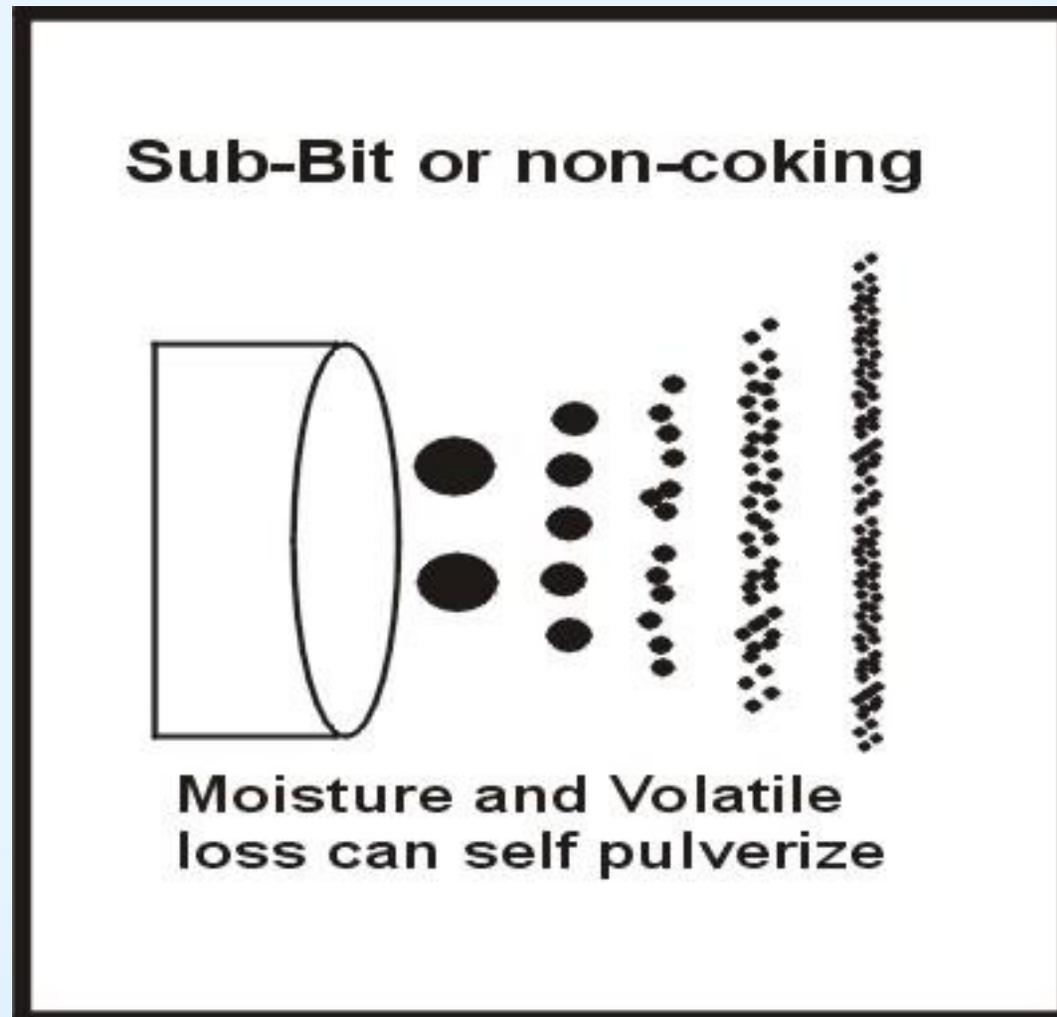
**Plastic properties of
Bit. coal swell particle
Have to start smaller**

Coal Combustion

Sub - Bituminous

1. Maintain 60-70% passing 200 mesh screen to increase through put.
2. Low Calorific Value and high moisture make for high mill loading
3. High Primary Air for drying and high coal flow sends reject material into the furnace

Sub-Bit Coal Combustion

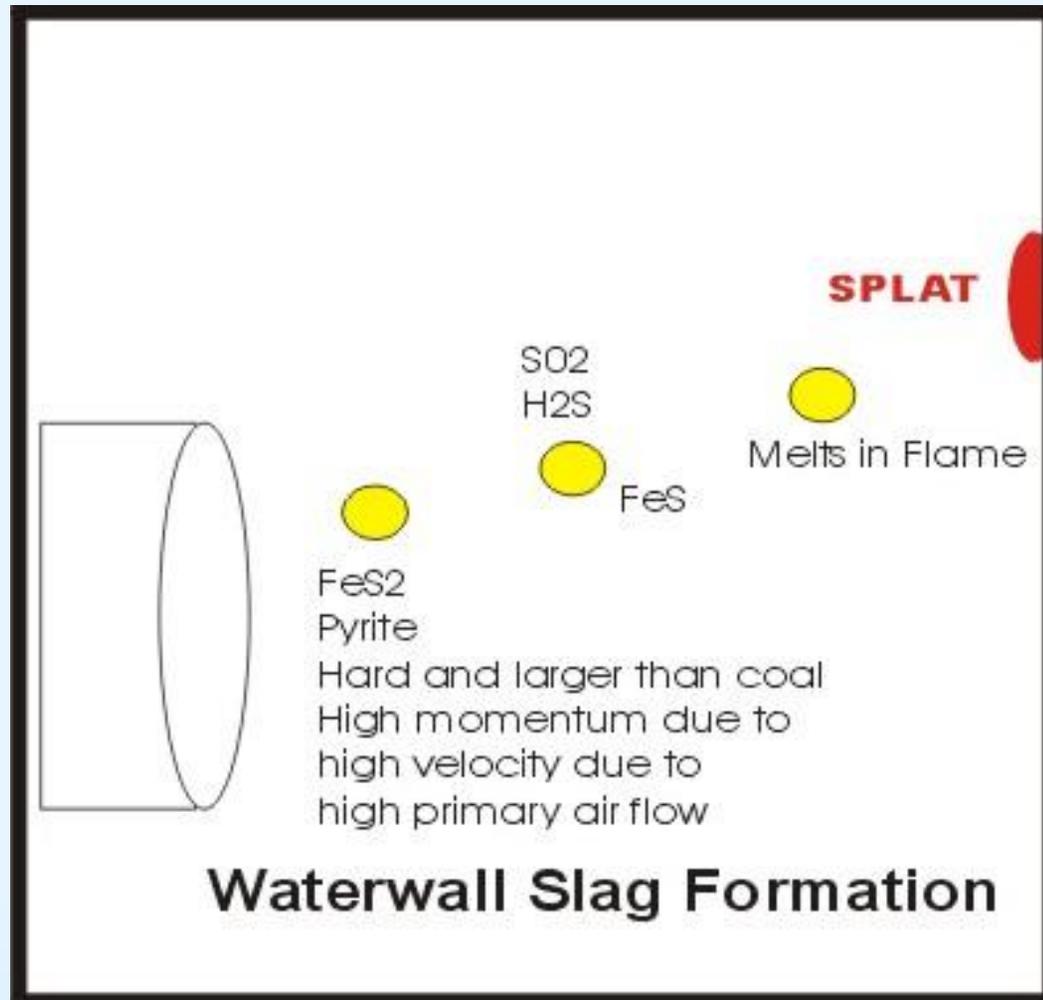


Coal Combustion

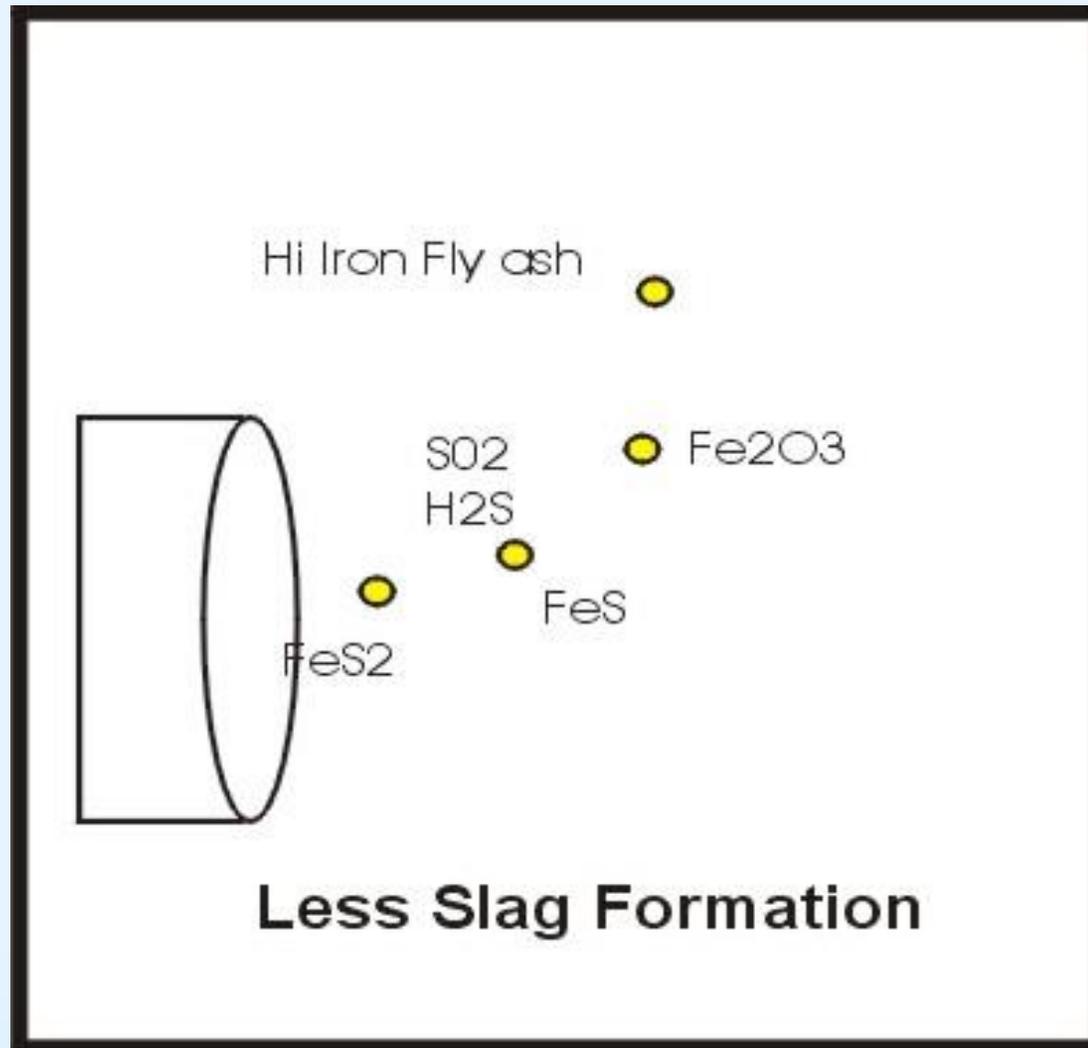
Sub - Bituminous

1. Hence sub-bit coal .
2. Low Calorific Value and high moisture make for high mill loading
3. High Primary Air for drying and high coal flow sends reject material into the furnace

Coal Combustion

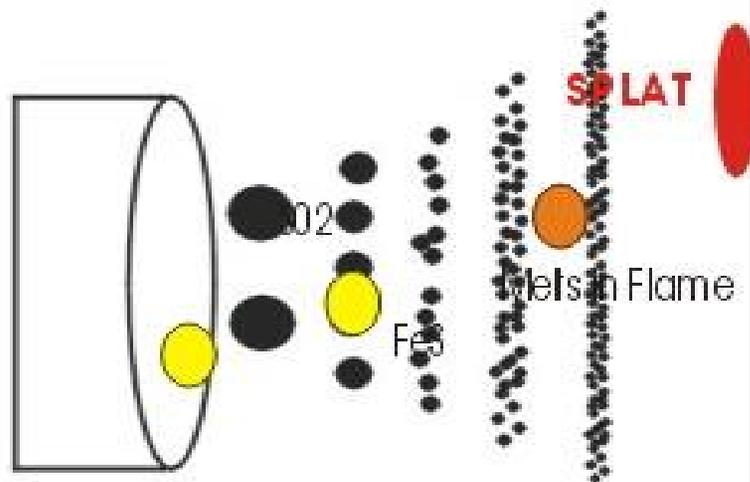


Coal Combustion



Coal Combustion

Blend of Sub bit and High Sulfur



Moisture and Volatile
loss can self pulverize

Advice – Set up plant

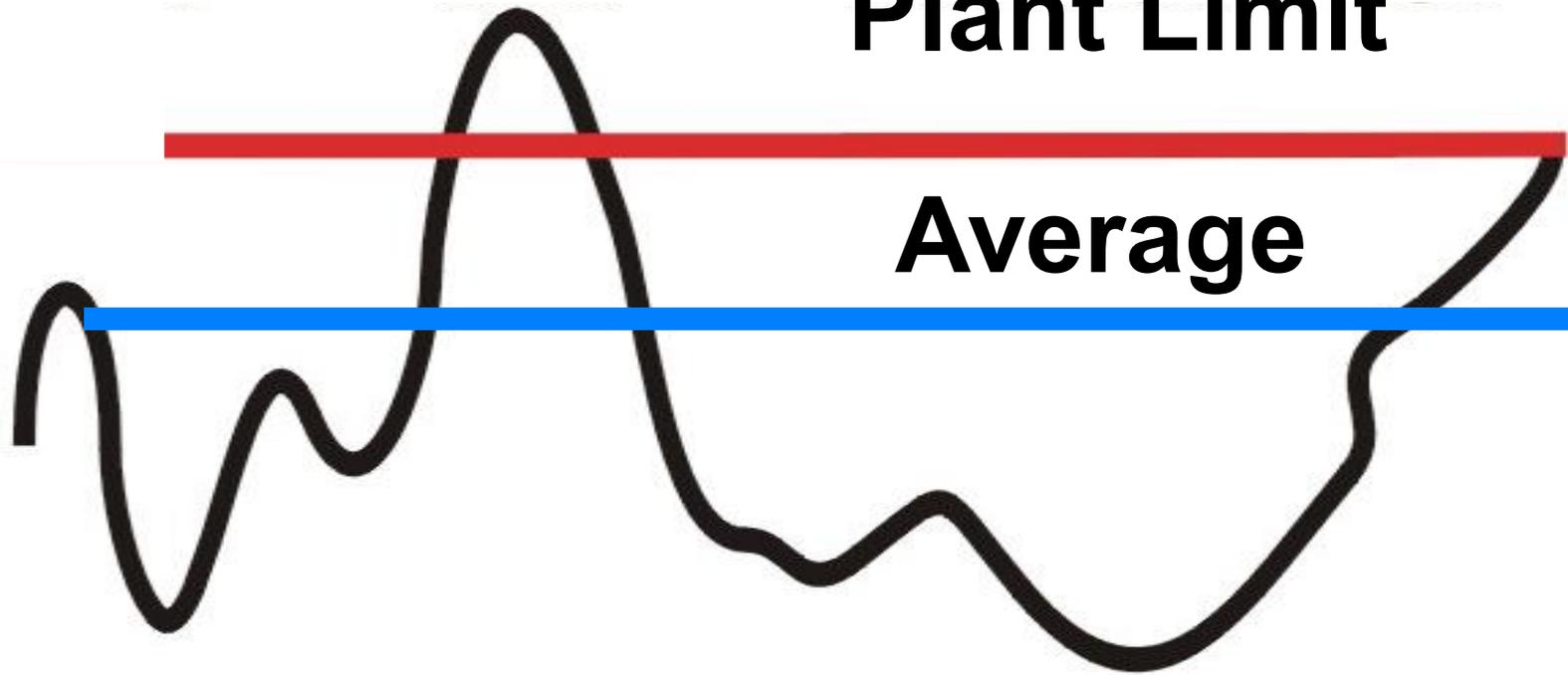
- 1.Pulverize to meet Un-reactive coal**
- 2.Pulverize for slag control-not carbon**
- 3.Maintain CV to take load off mill**

or

- 1.Change Expectation – Load, Forced Outage Rate, Maintenance,**

Plant Limit

Average



Raise the Plant Limit bar



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Thank You